REMARKS

Claims 1-4, 7-14, 17 and 20-26 are now pending in the application. Claims 5, 6, 15, and 16 are cancelled. Claims 1, 8, and 10 are amended. Support for the amendments can be found in the originally filed claims 5, 6, 15, and 16, and at paragraph [0021], especially as detailed in Application No. 10/082551, entitled "Enhanced Method for Digital Data Hiding" and filed by the assignee of the present invention on February 25, 2002. This application was incorporated by reference at paragraph [0021] in the originally filed specification at least for further implementation details of the enhanced spread spectrum watermarking technique. For example, see especially paragraph [0015] of the originally filed specification of Application No. 10/082551. Claims 24-26 are added. Support for the additions can be found in the originally filed specification at paragraphs [0021] and [0028]. Again, see especially paragraph [0015] of the originally filed specification of Application No. 10/082551. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

INFORMATION DISCLOSURE STATEMENT

Applicants thank the Examiner for considering the "Audio Watermarking of MPEG-2 AAC Bit Streams" reference discussed in the background section of the originally filed Specification at page 1. Applicants' acknowledge that the reference is prior art, and respectfully aver that there was no intent on Applicants' part to conceal the reference from the USPTO. The reference is now of record in the Application, and given that Applicants have no opportunity to submit the previously known Reference in an Information Disclosure Statement after Final rejection. Therefore, Applicants

respectfully submit that the issue of Applicants' duty to submit the reference in an Information disclosure Statement is now moot. Further, Applicants respectfully submit that Applicants' duty to submit the reference in an Information Disclosure Statement is henceforth discharged since the reference would be cumulative with the references now considered on the record.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-4, 7-14, and 17-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Neubauer et al. ("Audio Watermarking of MPEG-2 AAC Bit Streams) in view of Cox et al. ("Secure Spread Spectrum Watermarking for Multimedia"), and Birks et al. (US 6,373,530). This rejection is respectfully traversed.

The Examiner admits that Neubauer et al., Cox et al. and Birks et al. do not teach, suggest, or motivate embedding data in quantization indices of a partially decoded data stream using an enhanced spread spectrum technique that reduces variance of the partially decoded data stream by: (a) sorting the partially decoded data stream in at least one of ascending and descending order, thereby obtaining a sorted sequence; (b) constructing a new partially decoded data stream by taking the difference of every pair of two consecutive samples in the sorted sequence while alternating the sign of every other difference value; and (c) substituting the new partially decoded audio data stream for the partially decoded audio data stream, thereby causing watermark to be added to the new partially decoded audio data stream.

Applicant's claimed invention is generally directed toward embedding data in compressed audio data streams. In particular, Applicant's claimed invention is directed toward embedding data in quantization indices of a partially decoded data stream using

an enhanced spread spectrum technique that reduces variance of the partially decoded data stream by: (a) sorting the partially decoded data stream in at least one of ascending and descending order, thereby obtaining a sorted sequence; (b) constructing a new partially decoded data stream by taking the difference of every pair of two consecutive samples in the sorted sequence while alternating the sign of every other difference value, without performing manipulation across pairs; and (c) substituting the new partially decoded audio data stream for the partially decoded audio data stream, thereby causing watermark to be added to the new partially decoded audio data stream. For example, independent claim 1, as amended, recites, "wherein said data embedder is operable to reduce the variance of the partially decoded data stream by: (a) sorting the partially decoded data stream in at least one of ascending and descending order, thereby obtaining a sorted sequence; (b) constructing a new partially decoded data stream by taking the difference of every pair of two consecutive samples in the sorted sequence while alternating the sign of every other difference value, without performing manipulation across pairs; and (c) substituting the new partially decoded audio data stream for the partially decoded audio data stream, thereby causing watermark to be added to the new partially decoded audio data stream." Independent claims 8 and 10, as amended, recite similar subject matter. Thus, the cited references do not teach, suggest, or motivate all of the limitations recited in the independent claims. These differences are significant.

Accordingly, Applicants respectfully request the Examiner reconsider and withdraw the rejection of independent claims 1, 8, and 10 under 35 U.S.C. § 103(a), along with rejection on these grounds of all claims dependent therefrom.

Claims 5-6 and 15-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Neubauer et al. ("Audio Watermarking of MPEG-2 AAC Bit Streams) in view of Cox et al. ("Secure Spread Spectrum Watermarking for Multimedia"), Birks et al. (US 6,373,530), and Sprague (U.S. Pat. No. 4,617,645). This rejection is respectfully traversed.

Applicants respectfully assert that the cancellation of claims 5, 6, 15, and 16 render the rejection moot. However, in view of the amendments to the independent claims, the rejection is discussed below.

The Examiner admits that Neubauer et al., Cox et al. and Birks et al. do not teach, suggest, or motivate embedding data in quantization indices of a partially decoded data stream using an enhanced spread spectrum technique that reduces variance of the partially decoded data stream by: (a) sorting the partially decoded data stream in at least one of ascending and descending order, thereby obtaining a sorted sequence; (b) constructing a new partially decoded data stream by taking the difference of every pair of two consecutive samples in the sorted sequence while alternating the sign of every other difference value; and (c) substituting the new partially decoded audio data stream for the partially decoded audio data stream, thereby causing watermark to be added to the new partially decoded audio data stream.

Sprague is generally directed toward a compaction method for waveform storage. In particular, the Examiner relies on Sprague to teach reduces variance of the partially decoded data stream by: (a) sorting the partially decoded data stream in at least one of ascending and descending order, thereby obtaining a sorted sequence; (b) constructing a new partially decoded data stream by taking the difference of every pair

of two consecutive samples in the sorted sequence while alternating the sign of every other difference value; and (c) substituting the new partially decoded audio data stream for the partially decoded audio data stream. However, the Examiner wrongly states similarity between Applicants' claimed invention and the work of Sprague. In particular, the Examiner remarks that Sprague's operations "involve" sorting and taking the difference between consecutive signals. This description matches Applicants' claimed invention, but not Sprague's. According to Sprague's original presentation (equation in line 16 of col. 3), the description is significantly different from what is described by the Examiner. Notably, Applicants' claimed invention takes the difference between consecutive signal pairs, but do not perform manipulation across pairs. Therefore, one can think of Applicants' operation as only applying to the odd or even samples. For example, if the difference of sorted pairs x1 and x2 is taken, then the difference of sorted pairs x3 and x4 is also taken, but the difference of samples x2 and x3 is not taken. But in Sprague's work, his operation, which is not pure sample difference anyway (see equation in line 16 of col. 3), applies to every sample, such that the so-called "sample difference" of x1 and x2 is taken, and the so-called "sample difference" of x2 and x3 is also taken. This difference could lead to subtlety in applying watermarking to Sprague's scheme as modification to the operated signal (after the so-called "sample difference") can lead to significant error propagation to the signal in the original domain (before "sample difference"). Moreover, Sprague's equation does not alternate sign of every other difference value. Therefore, the differences between the teachings of Sprague and Applicants' claimed invention are significant.

Applicant's claimed invention is generally directed toward embedding data in compressed audio data streams. In particular, Applicant's claimed invention is directed toward embedding data in quantization indices of a partially decoded data stream using an enhanced spread spectrum technique that reduces variance of the partially decoded data stream by: (a) sorting the partially decoded data stream in at least one of ascending and descending order, thereby obtaining a sorted sequence; (b) constructing a new partially decoded data stream by taking the difference of every pair of two consecutive samples in the sorted sequence while alternating the sign of every other difference value, without performing manipulation across pairs; and (c) substituting the new partially decoded audio data stream for the partially decoded audio data stream, thereby causing watermark to be added to the new partially decoded audio data stream. For example, independent claim 1, as amended, recites, "wherein said data embedder is operable to reduce the variance of the partially decoded data stream by: (a) sorting the partially decoded data stream in at least one of ascending and descending order, thereby obtaining a sorted sequence; (b) constructing a new partially decoded data stream by taking the difference of every pair of two consecutive samples in the sorted sequence while alternating the sign of every other difference value, without performing manipulation across pairs; and (c) substituting the new partially decoded audio data stream for the partially decoded audio data stream, thereby causing watermark to be added to the new partially decoded audio data stream." Independent claims 8 and 10, as amended, recite similar subject matter. Thus, the cited references do not teach, suggest, or motivate all of the limitations recited in the independent claims. These differences are significant.

Accordingly, Applicants respectfully request the Examiner allow claims 1, 8, and 10, along with all claims dependent therefrom.
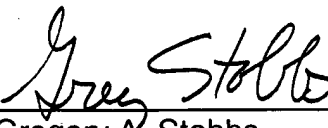
New Claims 24-26

Applicant's respectfully request the Examiner accord new claims 24-26 their due Examination. Support for the additions can be found in the originally filed specification at paragraphs [0021] and [0028]. See especially paragraph [0015] of the originally filed specification of Application No. 10/082551. Thus, no new matter is added.

Conclusion

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: Apr 25, 2006

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